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ABSTRACT

A perspective on artistic creativity developed by an artist and a psychologist is presented. The artist approaches art as a semiotic system built upon relations between visual isomorphisms. The psychologist is concerned with the origins of analogical thought in children's symbolic play and its possible maturation into a component of adult creativity. The paper is divided into two parts. In the first part the artist presents his aesthetic rationale and outlines the creative process. The focus is on the role of isomorphisms in visual art, both historically and in the artist's own work. In the second part of the paper, the psychologist discusses the artistic manipulation of isomorphisms as a theoretical construct in psychology. The concept of isomorphisms is placed into a larger theoretical perspective that studies creativity as a maturation of children's symbolic play. It is suggested that the ability to perceive and manipulate isomorphisms originates in children's symbolic play and matures into an important component of adult creativity. Preliminary findings of an instrument designed to measure creativity and aspects of symbolic play are presented. (RM)

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THE CREATIVE PROCESS IN ART:
AN INTERDISCIPLINARY PERSPECTIVE BY AN ARTIST AND A PSYCHOLOGIST

INTERNATIONAL CONFERENCE ON PSYCHOLOGY AND THE ARTS
1983, SEPTEMBER 5-9, CARDIFF, U.K.
UNIVERSITY OF WALES INSTITUTE OF SCIENCE AND TECHNOLOGY

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INTRODUCTION

This paper presents a perspective on artistic creativity developed by an artist and a psychologist. This perspective is unified by our mutual interest in the role of analogical thought in creative expression. The artist approaches art as a semiotic system built upon relations between visual isomorphisms. The psychologist is concerned with the origins of analogical thought in children's symbolic play and its possible maturation into a component of adult creativity. The artist is primarily concerned with the perception and manipulation of isomorphisms in art, while the psychologist is interested in creativity as a maturation of children's symbolic play.

The presentation is divided into two parts. In the first part, the artist will present his aesthetic rationale and outline the creative process. His focus will be on the role of isomorphisms in visual art, both historically and in his own work. A specimen of his work will be presented during the conference. In the second part of the presentation, the psychologist will discuss the artistic manipulation of isomorphisms as a theoretical construct in psychology. She will place the concept of isomorphisms into a larger theoretical perspective which studies creativity as a maturation of children's symbolic play. It will be suggested that the ability to perceive and manipulate isomorphisms originates in children's symbolic play and matures into an important component of adult creativity. The psychologist has also designed a measurement instrument for creativity and aspects of symbolic play. Her preliminary findings with this instrument will be reported.

Part I: An Artist's Commentary on Aspects of Artistic Creativity

As an artist, a good deal of my studio work has involved the visual arts as a semiotic, or symbol-making, system. In particular, I have an interest in resemblances of form or function between otherwise dissimilar objects. Examples of these resemblances would include resemblances of form, such as homologs (a bat's wing is a homolog of the human arm), resemblances of function, such as analogs (the tail of a dolphin is analogous to the legs of a man), and other more coincidental resemblances, such as the resemblance between the apparent motion of the stars and planets across the sky, and a thin metal disc revolving on the point of a needle. I have adopted the term isomorphism to refer to the aspect of resemblance which is perceived between two otherwise dissimilar things.

Within the context of the visual arts, isomorphisms may be used as a means of implying a relationship between seemingly unrelated things. Isomorphisms may also be used as a vehicle through which the artist is able to allude to something not directly present in the work, thereby allowing an image to acquire multiple levels of interpretation.

The role of isomorphisms in the visual arts may be thought of as similar to the role of metaphor in literary compositions. There are, however, two important distinctions which preclude the simple substitution of the word metaphor for the term isomorphism. First, metaphor is defined as a "figure of speech" in which one thing is likened to another. Given this definition, it is inappropriate to refer to a perceived resemblance between two things as a metaphor. Second, and more importantly, in a metaphor one thing is called by the name of something else. While any thing may be called by another name, this alone does not guarantee that the resulting association will be a meaningful one. Use of the term isomorphism implies that there is more than an arbitrary association present in the comparison.

I would like to add that the visual artist's ability to manipulate isomorphisms to form multi-leveled semiotic constructions is an aspect of the visual arts which is often overlooked by many researchers, or which receives comparatively less attention than does

the role of metaphor in studies of literature. I would like to suggest, also, that the ability to perceive precise and, at the same time, "poetic" resemblances may underlie the generation of the richest and most meaningful metaphors.

The selection of historical examples which follow illustrate the use of isomorphisms by visual artists.

1. Bull's Head by Pablo Picasso, 1943.
   While there is a strong resemblance of form between the bicycle parts and a bull's head, any attempt to literally extend the association between bicycles and bulls seems unproductive. Rather, this work, like the equivocal-image type of optical illusion, seems directed at a demonstration of the role of projection in the perceptual process.

2. Baboon and Young by Pablo Picasso, 1951.
   The artist's use of a baboon's face to reveal the anthropomorphic features of the toy car is both ironic and deeply suggestive.

3. The Isenheim Altarpiece by Matthais Grunewald, c. 1510-15.
   In this large complex work, painted by Grunewald for the monastic hospital order of Saint Anthony of Isenheim, a functional isomorphism occurs. "One of the main illnesses treated at the hospital was ergotism (called St. Anthony's Fire)...its symptoms—convulsions and gangrene—were well known. The gangrene often compelled amputation, and it has been noted in this connection that the two moveable halves of the predella of the altarpiece, if slid apart, would make it appear that the legs of the body of Christ had been amputated. The same observation can be made of the two main panels. Because of the off-center placement of the cross, the opening of the left panel would 'sever' one arm from the crucified figure."[1] This symbolism may have been suggested in part by Grunewald's patrons to evoke in the hospital's patients an empathic response to Christ's sufferings.

4. Death in a Tree (from the Frogner Fountain, Oslo) by Gustav Vigeland, c. 1908.
   The isomorphism involved here is the resemblance of form between the tree's gnarled branches and the skeleton-like figure of Death concealed within the tree. As George Heard Hamilton observed, "Vigelands allegories are not easy to decipher, and are best summarized as a statement of the doubt, disillusion, and physical decline that beset humanity on its passage through this world."[2]

5. The Haywain (center panel of a triptych) by Hieronymus Bosch, c. 1500.
   According to Walter S. Gibson, in the Haywain, "Bosch focuses on one of the Deadly Sins: the desire for worldly gain, or Avarice..."[3]
   The central image is a wagon of hay which represents the riches of this world. In this work, the resemblance between the color of hay and the color of gold provides the isomorphism. Around the wagon swarm a crowd of peasants, each of whom is attempting to grab handfuls of hay from the wagon, while others are crushed beneath its wheels. None of the participants seem to realize that the object of their frenzied efforts is a load of common hay.

6. I Like America/America Likes Me a performance work by Joseph Beuys, 1974. In this contemporary work, hay again appears as an ironic symbol of material gain. The description of Beuys' performance is by Nicolas Calas. "Cloaked in felt, Beuys would start the performance by striking a triangle with his...cane. This was followed by a loud engine noise to alert the coyote to the beginning of a "Pavlovian" experiment which included driving the animal, alternately, toward two heaps, one of hay and the other of copies of The Wall Street Journal."[4]

7. Pork Chops Compared to Breasts in Brassiere by Claes Oldenburg, 1964 Oldenburg comments, "I first made the comparison in terms of shape and texture, and only afterwards realized the cannibalistic implications, which probably led me to invoke God (dieu—as a progression from deux) to protect me from the consequences of wrong thinking."[5]

As these few examples suggest, the use of isomorphisms by visual artists is not a feature which is unique to the contemporary era or the exclusive property of a small or select band of practitioners.

I offer the "Artist's Rationale" which follows as a general example of the orientation in which an interest in isomorphisms, and related semiotic devices, may expect to be encountered. This rationale reflects my orientation toward art as a semiotic system and may also be taken as a statement of my hierarchy-of-concerns related to the art-making enterprise. Each artist, of course, is inclined to seek out his/her own particular niche within the larger ecology of the art world. However, I believe the position which I am presenting is fundamentally one which is shared by a significant number of working artists.

"Artist's Rationale"

The Role of the Artist

It is evident today that the visual arts have lost the sense of being an important and provocative part of the larger social system. The work of visual artists is, for the most part, only followed closely by other artists, critics, curators, private collectors, and art students. In short, the "art world" is rapidly becoming an insular and self-referential group. I believe this is the most compelling problem which faces the working artist today. The rationale which I am presenting attempts to respond to this situation.

I. Subject Matter: I place the greatest importance upon the subject matter which as a work addresses. I regard "art about art," or wholly formalist concerns, such as "paintings about paint," as perpetuating the insular and self-referential dilemma of the contemporary arts. The criteria I hold for subject matter is that it be meaningful outside of the immediate province of the art establishment, and that it contribute, in some measure, to the existing corpus of intellectual concerns. I would discourage any inference to the effect that the best subjects are those which are most easily digested by the largest number of people, or which contain pointed social or political messages. Rather, I am suggesting that art be considered no less an intellectual enterprise, simply because it is, simultaneously, a poetic one.

II. Expression: The degree to which any work yields unexpected insights into its subject at multiple levels of interpretation, is what I consider expression to mean. A work's expressiveness is a result of the artist's ability to perceive resemblances between unrelated things, manipulate those resemblances, and communicate them in an intelligible form. Here, isomorphisms are of the greatest utility. They provide a means by which bits of information may be cross-referenced to one another, thereby allowing the artist to consciously control the "layering" process.

III. Originality and Creativity: Originality involves looking at something in a new or different way, and is a divergent activity. Creativity involves divergence, but also involves the ability to synthesize the results of the divergent into a unified whole. Creativity involves both divergent and convergent thinking. Simply calling something by another name is original. Calling something by another name and having the result be meaningful is creative.

IV. Media: Every medium presents its own finite domain of possibilities. By this I mean, there are some ideas which can be realized more fully as a painting, for example, than as a marble sculpture. I believe that the traditional media (sculpture, painting, drawing), as they are understood today, no longer present a domain of possibilities which is large enough, or best suited to the ideas and intentions with which many artists are involved. Also, works in the traditional media are largely relegated to exhibition within the gallery and museum system. As the present situation of art seems to indicate, galleries and museums no longer function as an effective means of disseminating ideas to the larger social group. So, the artist is confronted with a double problem: Find a medium which offers a large domain of possibilities, and, at the same time, is capable of reaching large numbers of people through a dissemination system which, preferably, is independent of the galleries and museums. Ironicly, the mass media, which of course have been implicated as contributing, in no small measure, to the decline of the visual arts, may also afford the greatest potential as a means of resolving the problem.
I believe videotape, a medium which has been widely misunderstood and misused by artists, still presents an attractive possibility. Public access to videotapes by independent producers is increasing through rental libraries and cable television broadcasting networks, making videotape one of the most widely disseminated mediums.

V. Craftsmanship: Craftsmanship, or the manifested skill of the artist in handling a medium, is important in the sense that it contributes to a clear expression of the subject matter of a work and the artist's overall intentions. However, good craftsmanship alone is not enough. Art involves more than craftsmanship.

Summary of the Creative Process

The summary which follows outlines my perception of the major steps in the creative process. While this summary reflects my own working method, I believe it may be taken as a general model of the artmaking process as it is followed by most artists.

1. A decision is made to enter an art-related problem situation. Included in an art-related problem situation are an artist's working rationale, the exhibition parameters, and the artist's personal motivation.

2. Collect interesting data which relate to the problem situation. Sometimes an interesting theme suggests the type of data to be collected, and at other times, random data collection suggests a theme. The collected data include specimen isomorphic relations, data which suggest possible development of the isomorphic relations, and interesting data with no clearly defined use. Data include not only objects, images, texts, and the like, but also organizational strategies.

3. Examination of the data, allowing free associations to suggest other possible connections and organizing strategies.

4. Trial organization of data around a theme or organizing principle.

5. Evaluation of organizing strategy. If the strategy has been successful, it will suggest more precise data collection. If the trial strategy has been unsuccessful (meaning that it has fallen short of the criteria identified in the artist's rationale), one of two steps will be taken. Either the entire project is temporarily abandoned, or new data and a new organizational strategy are sought (return to step 2).

6. Dialectic interplay of data is extended and refined to maximize the semiotic content of the work.

I would like to add a short postscript to this section. Many critics and commentators on the arts treat the word art as if it were an alternative spelling of the word painting, and for those persons phrases such as "the death of painting" mean, literally, "the death of art." The fact that art does not depend for its existence upon any single medium has, of course, been amply demonstrated by the vicissitudes of art's history. What seems likely to happen in the future is that the new media, such as film and videotape, may produce a fusion of the visual, literary, and theater arts. However, even if this fusion of the arts occurs, I expect that the traditional forms of art-making will continue to survive. Like those modern-day practitioners of the ancient samurai techniques, who engage in mock-combat with archaic weaponry as a means of attaining a higher degree of spiritual and mental development, painters and sculptors may still practice their crafts, but with, perhaps, different ends in mind.

Part II: Creativity as a Maturation of Symbolic Play: A Psychologist's Perspective on Creativity

In Part One of this paper the visual arts were described as a semiotic system that uses isomorphisms to convey multiple levels of meaning. In Part Two, the concept of isomorphisms will be discussed within a theoretical perspective which views creativity as a maturation of symbolic play. Preliminary research in the development of a measurement instrument which could correlate changes in creativity and symbolic play throughout the life span will be presented.

Through my experiences of working with artists in the creation of artworks, and based upon my study of the psychological research on creativity, I have developed an interest in creativity as a maturation of symbolic play. A developmental relationship among children's play, imagination, and adult creativity has been suggested by many psychologists, most notably, Freud, Piaget, Vygotsky, Lieberman, and Hunt. These psychologists differ regarding the aspect of play which is most important, i.e., symbolic or make-believe play, rule-governed play, combinatory play, or exploratory play. I have chosen to concentrate upon symbolic play because of my interest in representational thought in creativity, and also because symbolic play encompasses the other types of play. Symbolic play includes rule-governed activities, combinatory and exploratory activities, and the manipulation of isomorphisms.

Three assumptions about creativity as a maturation of symbolic play should be distinguished:

1. Adult creativity has its origins in children's play.
2. Adult creativity is a more fully developed form of children's play.
3. Adult creativity is a more fully developed form of children's creativity.

The third assumption is perhaps the most controversial because it challenges the popular stereotype of the preschool-age child as being more creative than the adult. Empirical research is needed to describe how creativity changes with age, both in average and in gifted people.

The aspects of symbolic play which I regard as significant are the ability to recognize isomorphisms and the ability to perform analogical thinking. When I started working with artists my theoretical interest was in the psychoanalytic theory of creativity as a regression in service of the ego.[6] The artists' conscious manipulation of isomorphisms was reminiscent of the unconscious primary process thought of the dream-work described by Freud. Yet, the artists alternated between analogical and logical thought processes without a regression to immature behavior. They did not demonstrate a loss of reality orientation, an inability to delay gratification, or, an increase in egocentrism. While the artistic exploration of ideas was characterized by playfulness and humor, it was never entirely uncritical, and continually addressed the problem situation.

The question arose as to whether the analogical thought, characteristic of primary process thinking, might mature under ego control in some people. This inquiry led me to consider the origins of analogical thought in children's symbolic play, and its possible maturation into a component of adult creativity.[7] The revisions in the traditional psychoanalytic theory are as follows:

1. The conscious manipulation of isomorphisms is a maturation of primary process thought. The isomorphisms used by artists bear a striking resemblance to the visual analogies of the dream-work. Both the manipulation of isomorphisms and primary process thought involve analogical thought processes. The three mechanisms of the primary process (condensation, displacement, and representation)[8] can function in the isomorphic imagery of the visual arts. Condensation involves the multiple levels of meaning that can simultaneously be represented by a symbol. While the primary process has been traditionally regarded as an unconscious or a preconscious process, my inquiry has led me to consider possible conscious components of the primary process.

2. The analogical thought processes which characterize isomorph manipulations are not completely repressed during middle childhood, and may continue to develop consciously while logical thought processes are being acquired. While most children repress analogical thinking because of the social pressure to become logical, the degree of repression can vary among individuals. Those who repress the analogical processes give up both conscious awareness and control, while the analogical process continues to function unconsciously in the dream-work. Individuals who maintain conscious awareness of analogical processes may develop more control over these processes and may be capable of generating more isomorphic imagery and metaphors.

3. An equilibrium can be achieved between analogical and logical thought, which allows the individual to consciously alternate between these two modes of thinking without disrupting cognitive functioning. It is possible that this equilibrium is achieved in adulthood after the adolescent has mastered both analogical and logical thought processes.

A standardized measurement instrument was designed which describes the relationship between creativity and aspects of symbolic play throughout the lifespan. It was important that this instrument involve the recognition of visual isomorphisms and be appropriate for children and adults.

I examined the research model used by Getzels and Csikszentmihalyi in their study of art students,[9] and transformed it into a creativity test using 3-dimensional geometric shapes. In the Getzels and Csikszentmihalyi study, art students were asked to make a drawing from any of 27 given objects. There was a significant positive correlation between the amount of exploratory manipulation of the objects and the quality of the finished drawing. This was interpreted as evidence of the importance of problem-finding in creativity.

In order to control for technical skill, I decided to present a set of 3-dimensional geometric shapes to the subjects. Preschool age children as well as adults and adult artists were asked to make something using the shapes. The simple geometric shapes suggested many isomorphisms, so the ability of the subject to recognize isomorphisms and generate multiple interpretations of a construction could be studied.

The measurement instrument, which consists of eight simple geometric shapes, is called the Test of Creativity as Symbolic Play. A preliminary study was conducted in the spring of 1983.

Method:

Subjects: 46 subjects from ages 2-57 years were tested. The subjects were volunteers from the families of faculty and students at a community college. All subjects were white and middle class, except for two oriental subjects who were children being raised by a white middle class family.

Materials: The test used was the Test of Creativity as Symbolic Play. It consists of eight multicolored geometric shapes. The shapes (triangles, circles, squares, and semicircles) are of two sizes: the larger shapes are approximately 1-1/2 inch in their longest dimension and the smaller shapes are about 1 inch in their longest dimension. All of the shapes are 3/16 inch thick, to allow them to be stood upon their edge. The shapes were painted red, yellow, green, and blue. For consistency, the test was administered upon an 18 x 24 inch sheet of white paper.

Procedure: The shapes were poured out of a container onto the white paper. The experimenter then asked the subject, "What can you do with these shapes?" If the subject did not understand the question, the experimenter would then ask, "What can you make with these shapes?" After one item was made, the subject was asked to make something else. After about three items had been made, the subject was asked if the things being made had names or if they were just patterns. If no pictures were made spontaneously the subject was asked to make a picture with the shapes. If no vertical constructions were made the subject was asked to build something. The subjects were told that there was no time limit and that they could use as many of the shapes as they wished. All subjects were encouraged to make as many things as possible. The experimenter would ask each subject at various intervals, "Can you make something different?" All sessions were videotaped.

Scoring: The first 20 minutes of each session were scored. The number of items made was counted. Prototype categories were identified and the number of categories used by each subject was counted. There were 15 basic categories with 3 subcategories in each (horizontal constructions, vertical constructions, and symbolic constructions). An item was scored as a symbolic construction if it was named by the subject.

Results:

Eight (8) variables were recorded. The distribution of scores is presented in Table One.

Table One: The Distribution of Scores on Eight Variables

Variable	Range	Mean	S.D.
1. Age	2-57	20	15
2. Number of Items	3-47	14	8
3. Number of Categories	2-25	8	4
4. Number of Symbols	1-47	8	8
5. Symbol #7	0-6	1	1
6. Symbol #13	0-3	.7	1
7. Symbol #14	0-9	1	2
8. Amount of Time (minutes)	3-20	11	6

N = 46

The 20-40 age group had the highest performance on variables 2-8. The only significant correlations were between age and variables 6 and 7 (p .05). Variable 6 consisted of Symbol #13, the complex vertical constructions that were named. Variable 7 consisted of Symbol #14, the complex horizontal constructions that were named. Scattergrams showed the 20-40 age group as the peak on variables 2, 3, 4, and 5. There was a small peak at about age 6 years, however, the highest scores were in the 20-40 age group. Table Two presents the 6 highest scores on variables 2, 3, 4, and 5.

Table Two: The Six Highest Scores on Variables 2, 3, 4, 5

Six Highest Scores	Variable 2 Items	Variable 3 Categories	Variable 4 Symbols	Variable 5 Symbol #7 (pictures)
	score/age	score/age	score/age	score/age
1	47/21	25/29	47/21	6/21
2	35/29	15/32	21/6	4/29
3	23/6	14/36	20/29	3/6
4	23/32	12/6	17/21	3/9
5	23/36	12/32	17/32	3/20
6	22/29	12/39	16/32	3/29,33

These statistical data indicate that adults created more items, made a greater variety of items, and made more symbols than the children under 18 years of age. The small sampling of subjects over 40 precludes generalizations about this specific population. The number of subjects studied in each age group was as follows:

Number of Subjects	Age Range
4	48-57
17	20-39
9	11-19
7	6-9
9	2-4

Discussion:

This preliminary study indicates that adult performance on the Test of Creativity as Symbolic Play is higher than the children's performance. Variable 2, the number of items made, and variable 3, the number of categories used, can both be considered measurements of creativity as divergent thinking. Variables 2 and 3 represent, respectively, fluency and flexibility of thinking. Novelty, the third measure of divergent thinking, was not scored since practically every construction was unique in some way. These data suggest that adults in the 20-40 age group may be more divergent than children under the age of 8 years. The greater use of symbols by adults in the 20-40 age group is also evidence of imagination exceeding that of the under 8 years of age group. The complex symbolic constructions generated by the adult subjects included images of Charlie Chaplin, 3-D rocking cradles, and

sequences of dogs chasing balls. It is important to note that among the 6 adults who scored highest on most variables, 3 had pursued careers as professional visual artists (one had an M.F.A., and was an art teacher, another had a B.F.A., and the third spent some time as a student at the Art Institute of Chicago). Other differences among the age groups which I observed are summarized below:

1. 2-4 years: This group typically made abstract patterns which usually had no perceptual resemblance to the objects which the children claimed they were representing. The typical abstract patterns made by the children in this age group were either flat constructions or shapes stacked atop one another.

2. 6-9 years: This group showed a marked increase in symbolic constructions. It seemed that children in this age group had begun to master iconic symbolism and could recognize perceptual resemblances between different things (isomorphisms). Individual differences were obvious at this age and it is possible to distinguish between individuals who prefer symbolic constructions and those who preferred abstract patterns.

3. 11-19 years: The distinction between individuals who preferred symbols of abstract patterns continued.

4. 20-40 years: This group scored the highest on all variables. Those who made symbols built more elaborate constructions on a diversity of themes. The recognition of a symbol as having multiple interpretations occurred in this age span.

5. 48-57 years: The four subjects in this age group favored symbolic constructions, but the subjects did not generate as many different constructions as the 20-40 years of age group.

In future research, the test scoring procedures will be refined, the number of subjects increased, and the test's administration will follow the double-blind format.

This research is not repetitious of any psychology research to date. The most relevant contemporary research is that of Harvard University's Project Zero. While one of Project Zero's goals was to study the way in which symbols are used in the visual arts,[10] they did not study the role of isomorphisms, or collect data with average adults or adult artists. Project Zero's distinction between "dramatists" and "patterners"[11] may relate to the distinction between symbolizers and patterners presented in this paper. There are additional differences between the approach presented in this paper and that of Project Zero. Project Zero's U-shaped model hypothesizes a peak in creativity or artistic ability at 5-7 years of age.[12] The research presented in this paper suggests that

there may be a higher peak in adulthood. Perhaps a J-shaped model would more accurately represent the data which have been obtained. Howard Gardner has stated that artistic ability does not change qualitatively after age 7 or 8.[13] The data we have obtained suggests that a maturation of analogical thought occurs in adulthood. In their evaluations of children's drawings, Project Zero omitted three of Nelson Goodman's five criteria.[14] The omission of syntactic density, semantic density, and multiple and complex reference, as aspects of a work of art led to Project Zero's disregard of isomorphisms as a semiotic device in visual art. Whereas Project Zero emphasizes execution as the most important aspect of problem-solving[15] in visual art, we regard the conceptual aspects as most important.

FOOTNOTES

1. [1]Horst de la Croix and Richard G. Tansey. Gardner's Art Through the Ages, Volume 2: Renaissance and Modern Art, 7th Edition (New York: Harcourt Brace Jovanovich, 1980), p. 607.

2. [2]Nikolaus Pevsner, gen. ed. The Pelican History of Art (New York: Penguin Books, Inc., 1975), Painting and Sculpture in Europe 1880-1940, by George Heard Hamilton, p. 150.

3. [3]Walter S. Gibson. Hieronymus Bosch, Oxford University Press World of Art Series (New York: Oxford University Press, 1972), p. 71.

4. [4]Nicolas Calas. "Bodyworks and Porpoises," Art Forum, January 1978, p. 36.

5. [5]Claes Oldenburg. Notes in Hand (New York: E. P. Dutton & Co., Inc., 1971), catalog item 8.

6. [6]Ernst Kris. Psychoanalytic Explorations in Art, (New York: Schocken Books/ International Universities Press, 1974).

7. [7]Francine Smolucha. "Freud's Theory of Creativity Applied to a Work of Performance Art," Paper, Chicago, 1981.

8. [8]Sigmund Freud. The Interpretation of Dreams, trans. James Strachey (New York: Avon Books, 1965), Chapter VI.

9. [9]Jacob Getzels and Mihaly Csikszentmihalyi. The Creative Vision: A Longitudinal Study of Problem Finding in Art, (New York: John Wiley & Sons, 1976).

10. [10]V. A. Howard. "Harvard Project Zero: A Fresh Look at Art Education," Journal of Aesthetic Education, January 1971, p. 64.

11. [11]Jennifer Shotwell, Dennie Wolf, Howard Gardner. "Exploring Early Symbolization: Styles of Achievement," In Play and Learning, ed. B. Sutton-Smith (Gardner Press, 1979).

12. [12]Howard Gardner. Art, Mind, and Brain (New York: Basic Books, 1982), pp. 88-89.

13. [13]Howard Gardner. The Arts and Human Develoment, (New York: Wiley, 1973), p. vi.

14. [14]Howard Gardner. Art, Mind, and Brain, (New York: Basic Books, 1982), pp. 6, 95-98, 128-143.

15. [15]Howard Gardner. "Problem Solving in the Arts and Sciences," Journal of Aesthetic Education, January 1971.